Infectious Disorders - Drug Targets 2020; 20(4); 455-60

The emergence of quaternary ammonium compounds resistance in escherichia coli isolated from hospitals of qazvin, iran

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Abstract

Introduction: Escherichia coli is one of the most important agents involved in healthcare-associated infection, and resistance to quantum ammonium compounds (QACs) has become a major challenge for infection control practitioners. The aim of the current study was to determine the frequency of qacE and qacEΔ1 genes in E. coli isolated from hospitalized patients in Qazvin, Iran. Material and Methods: In the current cross-sectional study, 102 E. coli were collected from hospitals of Qazvin. All bacterial isolates were identified using standard laboratory methods and the antimicrobial susceptibility was evaluated by Kirby-Baer test. The presence of qacE and qacEΔ1 genes was investigated using polymerase chain reaction (PCR) technique. Results: In this study, 65 (63.7%) isolates showed a multidrug resistance (MDR) pattern which was resistant to at least three classes of antimicrobials including ß-lactams, aminoglycosides, and fluoroquinolones. The highest rates of resistance were observed against cefotaxime (75.5%) and nalidixic acid (66.7%). The PCR showed that 5 (4.9%) isolates harbored qacE gene, 62 (60.8%) isolates qacEΔ1, and 10 (9.8%) isolates carried both genes, simultaneously. There was a significant relationship between the QACs resistance and MDR pattern (P=0.03). Conclusion: This study indicated a significant resistance rate against disinfectant compounds in the studied hospitals. However, more attention should be paid to this critical issue in the infection control committees of the hospitals.

Keywords: Escherichia coli, quantum ammonium compounds, qacE, qacEΔ1, Kirby-Baer test, cefotaxime, fluoroquinolones.